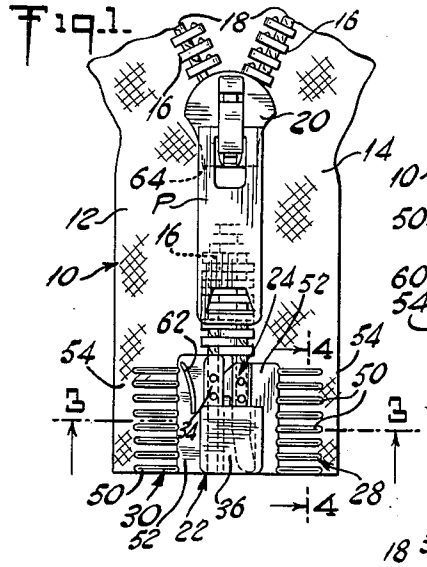
April 24, 1962 LA MOINE E. JOHNS ET AL 3,030,684

SLIDE FASTENER

Filed Jan. 6, 1959

FIG. 1.



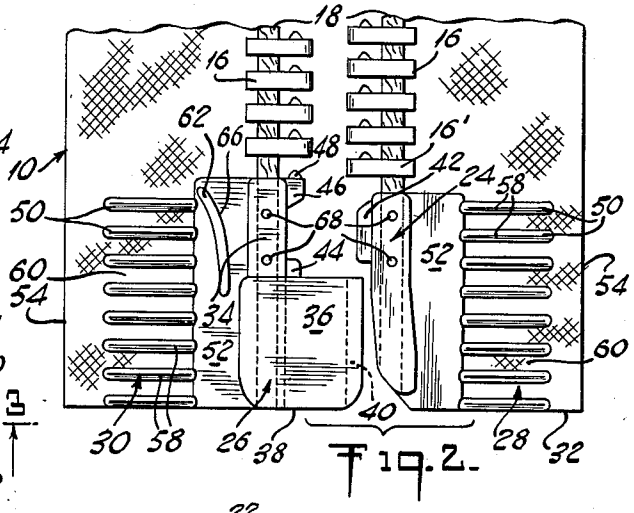


FIG. 2.

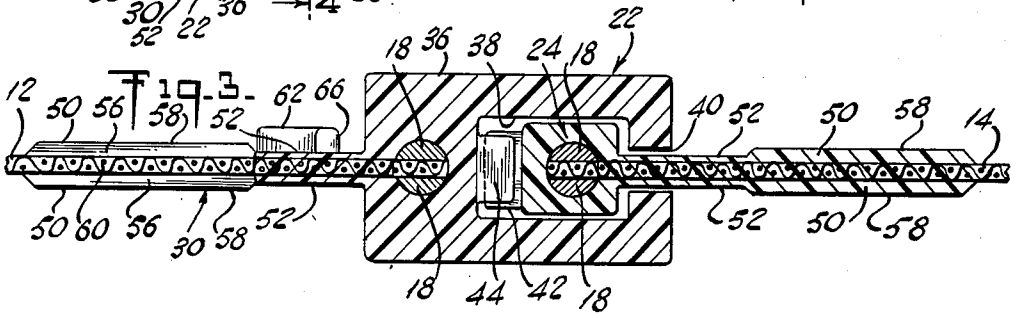


FIG. 3.

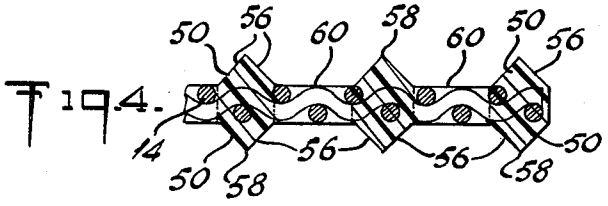


FIG. 4.

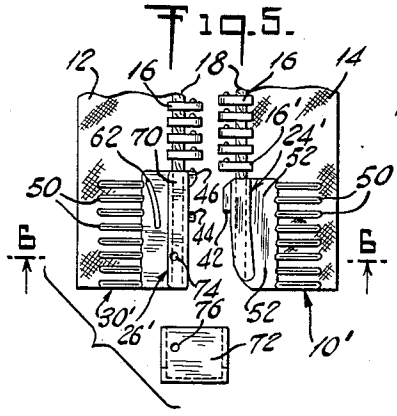


FIG. 5.

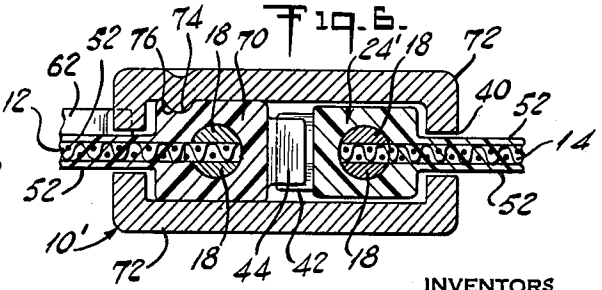


FIG. 6.

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SLIDE FASTENER

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4 Claims. (Cl. 24—205.11)

This invention relates generally to a slide fastener and, more particularly, to a separable slide fastener having a separable bottom stop assembly.

The primary aim and object of the present invention is the provision of an improved separable slide fastener which is eminently suitable for low cost mass production. Separable slide fasteners are characterized by the provision of separable end assemblies, including a socket portion on one stringer for receiving a pin on the other stringer. The pin and socket portion may be of diecast or molded construction, or may be formed of metallic stampings. In the latter case, the socket portion is usually formed by assembling a clip to a stud. Such heretofore used separable slide fasteners generally have the tape ends in the region of the bottom stop assembly reinforced, and such reinforcement has taken the form of reinforcement strips and devices applied to the tape ends or by extensions of the assembly components with supplementary securing means, al of which are complex and/or expensive to fabricate and assemble. Pursuant to the present invention, at least the pin member on one stringer and stud portion on the other stringer are of one-piece integral construction, having reinforcing structure for the tape ends integrally formed therewith whereby to provide a strong, aesthetically attractive and low cost bottom stop assembly. In one embodiment of the present invention the entire bottom stop assembly, including the aforenoted reinforcing structure, is formed in a single molding operation, the pin member of one stringer and the socket member of the other stringer being of one-piece integrally molded construction, with the reinforcing structure integrally molded therewith.

Another object of the present invention is the provision, in a separable slide fastener of the aforenoted character, of improved means for orienting the slider in its lowermost position against the separable end assembly.

Yet another object of the present invention is the provision, in a separable slide fastener of the aforenoted character, of a novel and improved tape end reinforcement which does not interfere with the normal operation of sewing the stringer tapes to the article or garment into which the slide fastener is to be incorporated.

The above and other objects, features and advantages of the present invention will be more fully understood from the following description considered in connection with the accompanying illustrative drawing:

FIG. 1 is a fragmentary plan view of a separable slide fastener formed in accordance with the present invention;

FIG. 2 is an enlarged plan view of the bottom region of the separable slide fastener with the separable end assembly uncoupled;

FIG. 3 is a sectional view, on an enlarged scale, taken on the line 3—3 of FIG. 1;

FIG. 4 is a sectional view, on an enlarged scale, taken on the line 4—4 of FIG. 1;

FIG. 5 is a view similar to FIG. 2, on a smaller scale, showing a modified form of separable slide fastener; and

FIG. 6 is a sectional view, on an enlarged scale, taken on the line 6—6 of FIG. 5, the separable end assembly being coupled.

Referring to the drawing, and more particularly to FIG. 1 thereof, there is shown a slide fastener **10** comprising stringers **12** and **14** having fastener elements or

scoops **16** clamped, or otherwise suitably secured, to the raised or beaded confronting edges **18** of the stringers, the fastener elements being meshed or unmeshed by means of manipulation of the slider **20** at pull P. Each of the stringers **12**, **14** is formed of a flexible narrow fabric tape of intersticed construction, the latter being inherent in the operation of weaving the tape. The stringers are held together at their lower ends by means of a separable end or bottom stop assembly generally designated **22**.

The end assembly **22** comprises a pin member **24** on stringer **14** and a socket member **26** on stringer **12**, said pin and socket members being releasably interengageable to couple the stringers. Pursuant to the present invention, the pin and socket members are each of one-piece integrally molded construction and have reinforcing structure generally designated **28** and **30**, respectively, integrally molded therewith and extending therefrom transversely of the stringers adjacent the lower end thereof. The pin and socket members are disposed immediately below the lowermost interlocking elements **16'** and said members and the reinforcing structure thereof may be integrally molded in situ onto the stringer tapes pursuant to any desired molding technique. Thus the pin and socket members may be separately molded in a single molding operation using any desired molding material, for example nylon. A strong bond between the molded pieces and the fabric tapes is achieved by the flow of molded material into the interstices of the fabric material.

The pin member **24** extends longitudinally of its companion beaded edge **18** from below the end scoop **16'** to the region of the lower edge **32** of its companion stringer, said pin member enveloping said beaded edge. The socket member **26** includes integrally formed stud and socket portions **34** and **36**, respectively, the socket portion **36** having an opening **38** dimensioned to receive the pin member **24** in collateral relation therewith. Communicating with the opening **38** is a tape slot **40** for the stringer **14**. The bottom stop assembly is provided with anti-mismesh means comprising a bump **42** integrally formed with the pin member **24** and bumps **44**, **46** integrally formed with socket member **26**, said latter bumps defining a space therebetween to receive the bump **42** in the assembled relation of the pin and socket members. Upstanding from bump **46** is a detent **48** which is interengageable with the lowermost interlocking member **16'** of stringer **14** in the assembled relation of the pin and socket members whereby to provide a strong positively interlocked bottom end assembly.

Each reinforcing structure **28**, **30** comprises a series of laterally spaced longitudinal ribs **50** which extend the major portion of the transverse extent of the stringers on both opposite faces thereof, the ribs on opposite faces being in registry and united through the interstices of the stringer tapes. In the molding operation the molding material is pressure flowed so as to provide for a flow of molding material through the interstices of the fabric tape so as to unite the oppositely disposed longitudinal ribs **50** through the fabric tape. The longitudinal ribs are interconnected with members **24**, **26** by means of the integrally formed connecting portions **52** disposed on the opposite faces of the stringers. The longitudinal ribs **50** preferably terminate short of the outer edges **54** of the stringers as shown. The portions **52** define track portions for the slider and are preferably of stiffer construction than the ribs **50** to aid bottom stop assembly. The longitudinal ribs **50** have the requisite degree of flexibility so as to provide for stringer flexibility at the bottom end assembly, and each of said ribs is cross-sectionally cam-shaped, for example of triangular cross-section having sloping side walls **56** terminating at apex **58** spaced from the plane of the stringers. This cam-shaped construc-

tion of the longitudinal ribs provides for the deflection of a sewing needle striking thereagainst into the space 60 between adjacent ribs. In the normal operation of sewing the stringer tapes to the article or garment into which the slide fastener is to be incorporated, the sewing needle travels along a path longitudinally of the stringers and transversely of the ribs 50, and in the sewing operation should the sewing needle strike a rib 50, it will be deflected by the inclined surfaces 56 of the rib into a space 60 between adjacent ribs whereby the ribs serve to reinforce the separable bottom assembly without adversely affecting the operation of securing the slide fastener into a garment or article.

The portion 52 of the socket member is provided with an integrally formed cam-shaped rail 62 which is disposed for coaction with the slider 20 for orienting the latter to upright position on manipulation thereof to its lowermost position against the end assembly 22. More particularly, the lower corner portion 64 of the slider coacts with the inner cam edge 66 of the rail 62 to tilt the slider to properly orient the same to upright position as the slider is moved against the end assembly.

From the above it will be apparent that the pin and socket members are each of one-piece integrally molded construction and have tape reinforcing structure integrally molded therewith, all being formed in a single molding operation and providing a strong, aesthetically attractive and low cost bottom stop assembly. The pin and socket members have apertures therein as indicated at 68 which are formed during the molding operation in which suitable clamping pins are used to retain the raised edges 18 in position.

With reference to FIGS. 5 and 6, there is shown a slide fastener 10' which corresponds to slide fastener 10, except in the respects to be described in detail below The slide fastener 10' comprises pin and socket members 24' and 26', respectively, the pin member 24' corresponding in all respects to the pin member 24 previously described. The socket member 26' comprise a stud 70 having a length and diameter generally comparable to the pin member 24'. The socket member further comprises a metallic clip 72 which is generally U-shaped and which is secured to the lower part of the stud so as to form a socket for receiving the pin member 24' in collateral relation to the stud. The stud 70 includes a recess 74 which is interengaged with the protuberance 76 of clip 72 in the operation of securing the clip to said stud. The stud 70 is of one-piece integrally molded construction and the reinforcing structure 30' is integrally molded therewith as aforedescribed. Thus, if desired, the socket member may be constituted by a molded stud 70 and metallic clip 72, this construction requiring the additional operation of forming the clip 72 and securing the same in assembled relation with its companion stud 70. In all other respects slide fastener 10' corresponds to slide fastener 10, having the novel features and advantages thereof. From the above it will thus be apparent that the socket member may be entirely of integrally molded construction as in fastener 10, or, if desired, the socket member may be of composite construction, being constituted by an integrally molded stud having a separately formed metallic clip 72 secured thereto.

It is believed that the construction and operation of the slide fastener and the bottom stop assembly of my invention, as well as the advantages thereof, will be apparent from the foregoing detailed description. It will also be apparent that while we have shown and described my invention in its preferred form, changes may be made in the structure disclosed, without departing from the scope of the invention, as sought to be defined in the following claims.

We claim:

1. A separable slide fastener, comprising a companion pair of stringers each having a row of interlockable fastener elements along one edge thereof, and a fully separable end assembly at one end of said fastener beyond said interlockable elements, said end assembly comprising a pin member on one stringer and a socket member to receive said pin member on the other stringer, said pin and socket members each having reinforcing structure extending therefrom transversely of the stringers adjacent said one end, and said pin and socket members each being of one-piece integrally molded construction and having said reinforcing structure thereof integrally molded therewith and united with said stringers to constitute reinforcement portions therefor, said reinforcing structure comprising a series of laterally spaced longitudinal ribs interconnected with said pin and socket members by slider track portions, said ribs and track portions extending a major portion of the transverse extent of said stringers on opposite faces thereof, the ribs on said opposite faces being in registry and united through the interstices of said stringers, said ribs being shaped to deflect a sewing needle striking thereagainst into the space between adjacent ribs.

2. A separable slide fastener, comprising a companion pair of stringers having a fully separable end assembly at the lower end of the fastener, each of said stringers comprising a flexible fabric tape, said end assembly comprising pin and socket members releasably interengageable to couple said stringers, said pin member being on one stringer and said socket member being on the other stringer, said pin and socket members each being of one-piece integrally molded construction and having reinforcing structure integrally molded therewith and extending therefrom transversely of the stringers adjacent said lower end, said reinforcing structure comprising a series of laterally spaced longitudinal ribs interconnected with said pin and socket members by slider track portions, said ribs and track portions extending a major portion of the transverse extent of said stringers on opposite faces thereof, the ribs on opposite faces being in registry and united through the interstices of said stringer tapes, said ribs being flexible and cross-sectionally cam-shaped to deflect a sewing needle striking thereagainst into the space between adjacent ribs.

3. A separable slide fastener, comprising a companion pair of stringers having a fully separable end assembly at the lower end of the fastener, each of said stringers comprising a flexible fabric tape, said end assembly comprising pin and socket members releasably interengageable to couple said stringers, said pin member being on one stringer and said socket member being on the other stringer, said socket member comprising stud and clip portions forming a socket for receiving the pin member in collateral relation to said stud portion, at least said pin member and stud portion each being of one-piece integrally molded construction and having reinforcing structure integrally molded therewith and extending therefrom transversely of the stringers adjacent said lower end, said reinforcing structure comprising a series of laterally spaced longitudinal ribs interconnected with said pin and socket members by slider track portions, said ribs and track portions extending a major portion of the transverse extent of said stringers on opposite faces thereof, the ribs on opposite faces being in registry and having their confronting surfaces united through the interstices of said stringer tapes, said ribs being flexible and cross-sectionally cam-shaped to deflect a sewing needle striking thereagainst into the space between adjacent ribs.

4. A separable slide fastener, comprising a companion pair of stringers having a fully separable end assembly at one end of the fastener, said end assembly comprising pin and socket members releasably interengageable to couple said stringers, said pin member being on one stringer and said socket member being on the other stringer, said socket member comprising stud and clip portions forming a socket for receiving the pin member in collateral relation to said stud portion, at least said

pin member and stud portion each being of one-piece integrally molded construction and having reinforcing structure integrally molded therewith and extending therefrom transversely of the stringers adjacent said one end, said reinforcing structure comprising a series of laterally spaced longitudinal ribs interconnected with said pin and socket members by slider track portions, said ribs and track portions extending on opposite faces of said stringers, the ribs on said opposite faces being in registry and united through the interstices of said stringers to constitute reinforcement portions therefor.

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